using said solder balls as an alignment mechanism for aligning an external optical signal to said device's optical receiver and/or transmitter.

ABSTRACT

A high density interconnect land grid array package device combines various electronic packaging techniques in a unique way to create a very thin, electrically and thermally high performance package for single or multiple semiconductor devices. A thin and mechanically stable substrate or packaging material (12) is selected that also has high thermal conductivity. Cavities (14) in the substrate or packaging material (12) accommodate one or more semiconductor devices that are attached directly to the substrate or packaging material. At least one of said semiconductor devices includes at least one optical receiver and/or transmitter. A thin film overlay (18) having multiple layers interconnects the one or more semiconductor devices to an array of pads (20) on a surface of the thin film overlay facing away from the substrate or packaging material. Solder balls (22), conductive adhesive or elastomeric connectors are attached to the pads to provide direct electrical and mechanical attachment means to other system hardware. In one embodiment of the invention, the optical receiver and/or transmitter receives and/or transmits light signals through the thin film overlay. In another embodiment of the invention, the optical receiver and/or transmitter receives and/or transmits light signals through holes (47) formed through the thin film overlay. The holes may be back filled with an optical quality material.